

## REMARKS

### *Amendment to Specification*

1. The amendment to the claims is in response to the restriction requirement made by the Examiner.

### **35 U.S.C. § 102**

2. The present invention provides a solution to the problem of improving the catalytic properties of a certain supported catalyst, in particular silver-containing catalysts with specific promoters (sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, and rare earth metals, as defined in claim 1). An improved catalyst performance (activity and/or selectivity) was found by selecting a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes, and depositing the specific catalytically active components onto the carrier (cf. the present application at page 2, line 29 – page 3, line 2). Evidence for the advantages can be found in the working examples, cf. in particular Table II on page 19 and the explanation provided at page 20 of the present patent application. The invention as presently claimed is novel and unobvious in light of the cited prior art.

The Examiner rejected claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49 under 35 U.S.C. § 102(b) as being anticipated by Thorsteinson et al. (U.S. Patent No. 5,187,140; "Thorsteinson", hereinafter).

Arguments in reply to these rejections under 35 U.S.C. § 102(b) have been provided in Applicant's response letter of April 18, 2003. Applicant adheres to these arguments and they are incorporated in this response letter by reference. The following paragraphs are intended to further elaborate on the arguments given, and to discuss the Examiner's remarks in response to Applicant's submissions.

The Examiner acknowledged that the Thorsteinson does not specifically disclose that the carrier has a sodium solubilization rate of no greater than 5 ppmw/5 minutes. The Examiner then goes on by submitting that "[Thorsteinson] teaches that it is important to remove ions that may affect the performance of the catalyst (column 15, lines 20-30)" (cf. the Office Action, page 3, lines 15-18).

It is respectfully submitted that the Examiner errs in the latter submission. What Thorsteinson teaches in col. 15, lines 20-30) is that "[f]or the sake of repeatability, in the use and reuse of impregnation solutions the carrier should preferably not contain

undue amounts of ions which are soluble in the impregnation solution and/or exchangeable with the promoter supplied to the catalyst, either in the preparation or use of the catalyst, so as to upset the amount of promoter which provides the desired catalyst enhancement. If the carrier contains such ions, the ions should be generally removed by standard chemical techniques such as leaching, otherwise they must be taken into account during the catalyst preparation."

Applicant cannot read in this citation a teaching that ions should be removed that may affect the performance of the catalyst. Rather the citation teaches that if the impregnation solution is used and reused the presence of certain ions may upset the amount of promoter in the impregnation solution, and in such a case there is a choice of removing such ions or taking them into account during the catalyst preparation. In col. 15, lines 20-30, Thorsteinson does not mention specific ions and, in particular, Thorsteinson is silent with respect to sodium ions.

The Examiner referred to Thorsteinson's Carrier "AJ", which is a water washed carrier having certain contents of impurities of fluoride, phosphate, aluminum, calcium, potassium, magnesium, sodium and silicon (column 46, lines 5-19), and the Examiner has submitted that Carrier AJ inherently meets the solubilization rate instantly claimed. Applicant respectfully submits that—as shown in the subsequent paragraphs—the novelty of the present claims over Thorsteinson can be stated independent of whether or not Carrier AJ inherently meets the solubilization rate instantly claimed.

Carrier AJ was used in Thorsteinson's Examples 108-116 (columns 55-56, Tables 31-33). In each impregnation in these examples (including the two-stage impregnations of Examples 111-116) a fresh impregnation solution was prepared and used. There is no example in Thorsteinson in which an impregnation solution was used and reused, as an illustration of the teaching of Thorsteinson's column 15, lines 20-30. Also, there is no apparent connection between the cesium promoter used in Examples 108-116 and any of the stated impurities of Carrier AJ. Thorsteinson does not teach a reason why one would water-wash a carrier when there is no intention to use and reuse an impregnation solution, and in many of Thorsteinson's Examples unwashed carriers were used which have vast amounts of impurities, apparently without taking them into account during the catalyst preparation. Thus, there is absolutely no link between the generic disclosures of Thorsteinson in column 15, lines

20-30, and any of the Examples, in particular the aspect of the water-washing yielding Carrier AJ and the stated impurities of Carrier AJ.

Thus, independent of whether or not Carrier AJ inherently meets the solubilization rate instantly claimed, in the generic disclosures of Thorsteinson there is no suggestion or teaching of using a carrier having a sodium solubilization rate of no greater than 5 ppmw/5 minutes for making a silver containing catalyst comprising one or more promoters selected from sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.

As indicated above, the Examples of Thorsteinson in which Carrier AJ was employed are Examples 108-116 only. Examples 108-116 mention cesium as the single promoter, and these examples are silent with respect to promoters selected from sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, and rare earth metals.

Thus, independent of whether or not Carrier AJ inherently meets the solubilization rate instantly claimed, in the Examples of Thorsteinson there is no suggestion or teaching of using a carrier having a sodium solubilization rate of no greater than 5 ppmw/5 minutes for making a silver containing catalyst comprising one or more promoters selected from sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof.

Thus, independent of whether or not Carrier AJ inherently meets the solubilization rate instantly claimed, in the entire disclosure of Thorsteinson there is no suggestion or teaching of using a carrier having a sodium solubilization rate of no greater than 5 ppmw/5 minutes for making a silver containing catalyst comprising one or more promoters selected from sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, rare earth metals, and combinations thereof, as recited in the present claims. This means that the claims are novel over Thorsteinson.

The Examiner has submitted that “[a]s each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated Thorsteinson et al.” (page 4, lines 8-9). It is respectfully submitted that the Examiner has erred. Namely, as it has been set out above that, independent of whether or not

Carrier AJ inherently meets the solubilization rate instantly claimed, Thorsteinson fails to disclose, teach or suggest the element of the combination of using a carrier having a sodium solubilization rate of no greater than 5 ppmw/5 minutes and using one or more promoters selected from sulfur, phosphorus, boron, fluorine, lithium, sodium, rubidium, Group IIA through Group VIII metals, and rare earth metals. For the purpose of 35 U.S.C. § 102, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. (Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631) It is respectfully submitted that this combination has been made for the very first time in the context of the present invention, and that this combination is an explicit element of the wording of the claims now under consideration.

As an addition, Applicant maintains that the Examiner has not satisfied the burden of proof required to raise this rejection under 35 U.S.C. § 102(b) based on a theory of inherent disclosure. In Applicant's response letter of April 18, 2003, it has been set out that, in the light of the relevant case law, the Examiner's reasoning does not reasonably support a determination that “a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes” necessarily flows from the teachings of Thorsteinson. Without more, a teaching of ion removal, a washing procedure, and a level of leachable sodium impurities, which the Examiner asserts are present in Thorsteinson, provide insufficient basis for any determinations or estimations concerning whether a sodium solubilization rate is no greater than 5 ppmw/5 minutes. At best, the Examiner has proposed a mere possibility of what Thorsteinson may inherently contain.

Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections.

**35 U.S.C. § 103**

3. The Examiner rejected claims 6-7, 19-20, 34-35, and 43-44 under 35 U.S.C. § 103(a) as being unpatentable over Thorsteinson et al. (U.S. Patent No. 5,187,140), as applied to claims 1-5, 8-10, 13-18, 21-33, 36-42, and 45-49 in the aforementioned rejection under 35 U.S.C. § 102(b), in further view of Matusz (U.S. Patent No. 5,739,075).

Applicant's considerations relating to Thorsteinson under the heading of 35 U.S.C. § 102, hereinbefore, are also relied upon in refuting these rejections under

35 U.S.C. § 103. Further, arguments in reply to these rejections under 35 U.S.C. § 103 have been provided in Applicant's response letter of April 18, 2003. Applicant adheres to these arguments, they are incorporated in this response letter by reference and they are also to be read in conjunction with the remarks above under 2.

Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections.

4. The Examiner rejected claims 1-6, 9-19, 22-34, 37-43, and 46-49 under 35 U.S.C. § 103(a) as being unpatentable over Finch et al. (U.S. Patent No. 2,424,083, "Finch" hereinafter) in view of Notermann et al. (U.S. Patent No. 4,994,587, "Notermann" hereinafter).

Arguments in reply to this rejection under 35 U.S.C. § 103 have been provided in Applicant's response letter of April 18, 2003. Applicant adheres to these arguments and they are incorporated in this response letter by reference. The following paragraphs are intended to further elaborate on the arguments given, and to discuss the Examiner's remarks in response to Applicant's submissions.

The Examiner submitted that "[i]t would have been obvious [...] to substitute the carrier taught by Finch with the carrier taught by Notermann [...] in the light of the suggestion of Notermann that the use of low sodium alumina carrier will obtain a catalyst with improved properties and avoid deleterious effect of leachable sodium" (cf. the Office Action, page 7, lines 10-15; Notermann, column 13, lines 28-35). However, it is respectfully submitted that the Examiner has based the rejections on a selective consideration of only portions of Notermann. According to the Manual of Patent Examining Procedure, 9<sup>th</sup> Edition, paragraph 2141.03, "[a] prior art reference must be considered in its entirety, i.e. as a whole, including portions that would lead away from the claimed invention" (emphasis added).

Applicant respectfully submits that the Examiner's citation of Notermann's column 13, lines 28-35 has to be read in conjunction with Notermann's passage in column 11, lines 19-47, which teaches that different instances lead to different effects of leachable sodium, namely: "The presence of leachable sodium [...] tends, in some instances, to improve the efficiency of the system under epoxidation conditions generally used. In the presence of CO<sub>2</sub> and certain efficiency enhancing compounds, however, sodium exhibits deactivating and effective life-shortening effects on epoxidation catalysts and systems. [...] The catalyst and process of [Notermann's]

invention diminish the deactivating and life-shortening effects of CO<sub>2</sub>" (emphasis added).

Thus, on the one hand, Notermann contains the general teaching that the presence of leachable sodium improves the efficiency under epoxidation conditions generally used, and, on the other hand, Notermann contains the specific teaching only applicable to cases of deactivating and life-shortening effects of CO<sub>2</sub>, in which it is advantageous to use Notermann's invention, i.e. to use a carrier with a low content of leachable sodium.

Finch teaches that "[t]he activity of the catalysts may, in many instances, be further materially increased or promoted by the addition of small amounts of a sodium compound". Finch is completely silent about CO<sub>2</sub>, as such, let alone any deactivating and life-shortening effects of CO<sub>2</sub>.

Applicant respectfully submits that if the skilled person would have a reason to consult Notermann in relation to Finch's disclosures, in the absence of any reference in Finch to (effects of) CO<sub>2</sub>, he would have motivation only to follow Notermann's general teaching that the presence of leachable sodium tends to improve the efficiency of the system". This general teaching would discourage him from applying a carrier with a low content of leachable sodium, let alone a carrier with a low sodium solubilization rate, e.g. no greater than 5 ppmw/5 minutes. This general teaching clearly leads away from the present invention.

In the absence of any reference in Finch to (effects of) CO<sub>2</sub>, the skilled person would not find any motivation to apply Notermann's specific teaching which aims at diminishing deactivating and life-shortening effects of CO<sub>2</sub> by using a carrier with a low content of leachable sodium. Preparing such carriers would also require elaborate procedures such as set out in Notermann's column 13, line 41 - column 14, line 65. As an addition, even if the skilled person would find motivation to apply a carrier with a low content of leachable sodium, then still he would not necessarily arrive at using a carrier with a low sodium solubilization rate, e.g. no greater than 5 ppmw/5 minutes.

In view of the above, it is respectfully submitted that the rejections, based on Finch and Notermann, are not based on a proper consideration of Notermann, and that a proper consideration of Notermann in its entirety leads to the conclusion that Notermann leads away from the present invention.

The Examiner has submitted that Notermann's carrier inherently meets the solubilization rate instantly claimed. On the one hand, –as shown in the previous paragraphs– the non-obviousness of the present claims over Finch and Notermann can be stated independent of whether or not Notermann's carrier inherently meets the solubilization rate instantly claimed. On the other hand, Applicant maintains that the Examiner has not satisfied the burden of proof required in considering that ('because Notermann teaches removing leachable sodium from the carrier material") the resulting material will have the solubilization rate instantly claimed. In Applicant's response letter of April 18, 2003, it has been set out that, in the light of the relevant case law in this field, the Examiner's reasoning does not reasonably support a determination that "a carrier having a sodium solubilization rate no greater than 5 ppmw/5 minutes" necessarily flows from the teachings of Notermann. At best, the Examiner has proposed a mere possibility of what Notermann may inherently contain.

Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections.

5. The Examiner rejected claims 7-8, 20-21, 35-36, and 44-45 under 35 U.S.C. § 103(a) as being unpatentable over Finch et al. in view of Notermann et al. as applied to claims 1-6, 9-19, 22-34, 37-43, and 46-49, discussed above, and further in view of Matusz. In making the present rejection, the Examiner relied upon the modified disclosure of Finch et al., discussed above, as applied to claims 1-6, 9-19, 22-34, 37-43, and 46-49 to support the present rejection.

Arguments in reply to these rejections under 35 U.S.C. § 103 have been provided in Applicant's response letter of April 18, 2003. Applicant adheres to these arguments, they are incorporated in this response letter by reference, and they are also to be read in conjunction with the remarks above under 4.

Applicant respectfully requests that the Examiner reconsider and withdraw the present rejections.

Each of the rejections having been traversed, allowance of the claims of the present application is respectfully requested. If the Examiner would like to discuss this case with Applicant's attorney, the Examiner is invited to contact Richard Lemuth at the phone number below.

Respectfully submitted,

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**AMENDMENTS TO SPECIFICATION  
for US 09/992,784  
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**IN THE CLAIMS:**

Please delete claims 50-53.